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The Price Roller Coaster: Can Air Carriers Ride It?

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Abstract

Last minutes tickets, group tariffs, agency prices, low cost promotions are buzzwords in the intensively competitive airline industry. These are all connect to prices strategies which constrains and simultaneously impels air carriers to analyze and redefine commercial strategic decisions. The low-cost airline model versus legacy carrier model has spurred ongoing debate. With the current world economic crisis (especially in Europe), airlines need to redefine their marketing strategies so as to: (i) survive/compete and (ii) meet consumers' demands, which are ever-more price-sensitive and questioning the value proposition of the airline carriers. Thus, it seems relevant to revive research on this subject and to unveil some of the elements associated with price discrimination strategies. This study analyzes price dispersion in the intra-European airline market, using a significant sample of the prices posted on the city pairs Lisbon – Paris and Madrid – London. The aims is to test some key factors that may influence price dispersion, which airlines can take into account when developing and evaluating their pricing strategies. Specifically, this work attempts to test the relation between price dispersion among airlines and their capability of price discriminating as a result of their market power and differentiating full service carriers from low cost carriers. The results revealed that neither the full service nor the low cost carriers show differences on price dispersion, when testing the interaction of these type of airlines with each of the market segmentation factors.

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Keywords: Price dispersion; airline business; hub dominance; full service carrier; low cost carrier

1. Introduction

In the last two decades, global air travel has significantly increased. Air travel is no longer considered a luxury reserved for a privileged minority; it has become part of everyday life for many, whether for business trips or leisure. Nevertheless, this industry continues to be characterized by high fixed and variable costs, with excessive capacity and a highly segmented market. Therefore, it has differentiable price sensitivities. In this context, emerging airlines have one of two completely different business propositions: low-cost service (LCS)

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and full carrier service (FCS). Despite the main differences in cost structures, consumers tend to confuse "low cost" with low prices.

Airlines have already adopted advanced inter-temporal pricing mechanisms that allow to change airfares daily. There are numerous reasons for firms to charge different prices for the same good or service. Perhaps the most obvious reason is to exploit customer heterogeneity in reservation prices. In the low-cost airline model versus legacy carrier model has spurred ongoing debate a question is raise: *Does competition characteristics' influences price discrimination?*

In essence, price dispersion is the variation of homogeneous product prices that are sold by competitors. It is a phenomenon that has been the subject of study by researchers in economics and, more recently, in marketing field (Gailey, E. D. 2009).

Economists explain the dispersion of prices as a violation of the assumptions of Bertrand (Gailey, E. D. 2009), which rarely occur in real markets: (i) fully informed consumers (requirement for homogeneity of consumers); (ii) lack of information about costs; and, (iii) the homogeneity of the products.

The heterogeneity of consumers' behavior lies in the differences of price information about consumer products. The works of Salop and Stiglitz (1977) and Varian (1996) are references for understanding price dispersion resulting from information asymmetries. Typically, this means that there are companies that charge low prices to attract informed customers, while other can pursue high-price strategies to sell to consumers who are not so well informed (Gailey, E. D. 2009).

Salop and Stiglitz (1977) studied the diversity of consumers and found that the dispersion of prices depended on the magnitude of the costs of information between the two groups of consumers and economies of scale. As for the information search costs, Stigler (1961), in a pioneering article on price dispersion, classifies it as a measure of market ignorance. The author argues that advertising and promotion are powerful tools to eliminate market ignorance. Stigler (1961) concludes that price dispersion in homogeneous products is caused by lack of consumer information, due to the costs of research and the variations in "terms of sale" (customer service and storage of the products).

Borenstein and Rose (1994) analyzed the prices of airfares on the U.S. market to assess the effect of competition on price dispersion, and found a positive relationship. The results are consistent with the competitive-type models of price discrimination and reject discrimination of a monopolistic type as the main source of price dispersion in the airlines. The variables used by the authors to assess the construct "competition" included the concentration of the market, market share, market, intensity of domain at the airport of destination, market structure (monopoly, duopoly or competitive market).

Civil aviation is one of the sectors in which the dispersion of prices is clearly present. Borenstein and Rose (1994), referred to throughout the literature on price dispersion in civil aviation, analyzed the prices of airfares in the U.S. domestic market charged to different passengers on the same route. They verified the dispersion increases on routes with the highest number of competitors or with less frequency of flights. For these researchers, there are two sources of price dispersion: i) price discrimination; and ii) cost to serve different customers.

Hayes and Ross developed a model of price dispersion in order to distinguish between the impact of price discrimination and the resulting peak load pricing schemes, or atypical competition, resulting from the financial difficulties affecting the sector starting in 1990. The results obtained by the researchers suggested that the dispersion of prices in this industry was mainly related to the peak load pricing strategies and the price war of the early 1990s, but not so much with price discrimination.

Price differences are also often attributed to the relative market power of sellers. Lijersen and Voort (2011) analyzed airfares in the market of medium and long-haul flights originating in Europe, noting that the price dispersion is more related to the absence of market share than with the concentration of the market. These authors

found that the price dispersion and the inequality of market share are caused by differentiation, even if not observed, of products.

These empirical findings suggest that markets are not frictionless, and that all consumers are not perfectly aware of services and pricing characteristics, enabling price discrimination base strategies. However, can these differences be always observed between full-carriers services and low-cost airlines?

2. Conceptual Framework

Price dispersion has been studied by marketing researchers with the aim of assessing the impact on consumer price strategies, sales, revenue and profitability of companies and industries. In the case of air transport, the range of prices acceptable to consumers depends on the number of companies that operates in a given route or city-pair, as well with the level of service offered. From the perspective of the airlines, the willingness of consumers to accept price changes in the same route gives them an opportunity to adjust the price's prevailing conditions at the time of sale (Gailey, E. D. 2009). Our work explores some key factors that can influence the price dispersion, and assesses its consistency with theories that guide these factors. It aimed to deepen the knowledge of the variables that influence the dispersion of prices, which should be taken into account by the airlines when they develop and evaluate their competitive strategies on pricing.

In their pioneering study, Borenstein and Rose (1994) documented the existence of significant dispersion in prices charged by each airline for its direct services between the city-pairs with higher density of traffic from the domestic market. Subsequent studies, both in the domestic market (Gailey, E. D. 2009, Hayes, K.J. and L.B. Ross) and inter-European (Lijesen, M., & Voort, M. 2011, Gaggero, A. A., & Piga, C. A. 2009), also noted the existence of price variations between airlines and the city-pairs studied. The first hypothesis intended to test for the existence of differences in price variation between airlines and city of departure, analyzing the effect of interaction of these two variables:

H1: The combined effect of the factors of the airline and city of departure generates differences in levels of price dispersion.

According to Bernstein & Rose (1994), one of the main sources of price dispersion in the air transport market is price discrimination based on customer segmentation. Advance purchase of a trip is one of the mechanisms of customer segmentation (Dana, J. D. 1999). It is believed that consumers who buy tickets on dates closer to the day of the trip are willing to pay a higher price. This means that, by failing to book well in advance, your opportunity cost increases as it approaches the date of travel (Chellappa, R. K., Sin, R. G., & Siddarth, S. 2011). The airlines use this recovery time to segment consumers into those buying in advance and those buying late. The Varian model (1996) suggests that the dispersion of prices will be higher in markets that allow late booking. This proposition has been empirically confirmed by Chellappa et al. (2011), with reference to the domestic market of the United States, leading us to test the following proposition on the intra-European market.

H2: The dispersion of prices increases when approaching the date of travel.

Another customer segmentation mechanism consists of the tariff rule that requires the passing of a night from Saturday to Sunday as a way of segmenting customers into those who travel for business and those who travel for leisure (Dana, J. D. 1999). Bilotkach (2005) found that the rates for business travel differ between the various airlines, while the tourist rates are largely homogeneous. Borenstein and Rose (1994) had previously found that the high concentration of leisure traffic is associated with lower levels of price dispersion. Lisejen and Voort (2011) in their study on intra-European air travel, found that the travel on Saturdays and Sundays had a negative impact on price dispersion. Gaggero and Piga (2009) suggest a price discrimination based on the preference of passengers to travel at these times of the year. Hayes and Ross associate the ability of an airline to practice price discrimination with its power. Borenstein (1989) found empirical evidence that airlines have greater market power in their hubs.

Following the liberalization of air transport, companies that operated point to point began to consolidate their operations at a specific airport, which became a hub. The airline went on to combine local traffic and connecting traffic on the same flight, building a network known as hub-and-spoke (Gailey, E. D. 2009). The hub domain translates to serving a larger market share, which is enhanced by marketing tools in which the customer loyalty programs play an important role (Borenstein, S. 1989). These Frequent Flyer Programs are known for travel offers made available as the customer uses the services of the company. Bearing in mind that the ability of an airline to practice price discrimination is strongly linked to its market power, we want to test the effect of the hub domain factor and its interaction with each customer segmentation factor —reason and duration of the journey — through the third hypothesis:

H3: The dispersion of prices is different depending on the company's ability, based on its market power, and according to the variables of trip reason and travel period.

Hayes and Ross identified atypical levels of competition in the air transport market, as a result of financial difficulties that most national companies had in the early 1990s. The price wars occurred in the same period, while Southwest Airlines became the first airline with a low-cost business model. Although these researchers identified the existence of price dispersion in their study, the underlying causes were different from those established in the previous decade, due to the deterioration in the ability of airlines to exploit market power through price discrimination. More recently, Chellapa et al. (2011), who also studied the American domestic market, found that the presence of LCC changes the behavior of traditional companies on pricing. This led them to conclude that the FSCs tend to imitate LCCs when faced with these type of competitors (Chellappa, R. K., Sin, R. G., & Siddarth, S. 2011). In this study, we are interested in testing LCCs present differences in the dispersion of prices for FSCs on the basis of different customer segmentation strategies, evidenced in price discrimination factors, reason and duration of the trip. To this end, we have drawn up the following hypothesis:

H4: Price dispersion varies between LCCs and FSCs due to different price discrimination strategies highlighted by the factors of reason for the trip and travel period.

3. Data treatment and results

The analysis of research on the theme of price dispersion cannot find a single framework that defines all sources of price dispersion in the aviation industry. Thus, this work seeks to determine which elements cause the dispersion of prices in Europe. To this end, it examines the routes of Lisbon-Paris and Madrid-London, which are served by both "full service" and "low cost" airlines and have similar distances and flight times. Such similarities implied similar operating costs. Moreover, both London and Paris are cities with multiple airports and large intercontinental hubs and Madrid and Lisbon are important hubs between Europe and Latin America. Various scenarios have been designed, considering the lower rates available from each airline for each city pair, in economy class on non-stop flights.

This market can be divided in two major groups: business and leisure travelers. Many companies have discriminate prices between these two groups through the tariff rule that forces you to spend Saturday night in destiny. Failure to observe this rule applies to the business segment and translates into higher prices. The rule also causes price variation. Generally, the closer the date of travel, the higher the price. This study built two scenarios to get rates for both groups and the advance factor. A total of 1,440 observations were obtained.

Table 1- Data description

Airline/Departure City		Lisbon	London	Madrid	Paris	Hub	Business Model
AF	Air France	16	0	0	16	Yes (CDG)	FCS
BA	Bristish Airways	0	16	16	0	Yes (LHR)	FCS
FR	Raynair	0	16	16	0	No	LCC
IB	Iberia	0	16	16	0	Yes (MAD)	FCS
TP	TAP Portugal	16	0	0	16	Yes (LIS)	FCS
U2	Easyjet	16	16	16	16	No	LCC
UX	Air Europa	0	16	16	0	No	LCC
ZI	Aigle Azur	16	0	0	16	No	LCC

Then an analysis of variance of a factor was conducted in order to test the effects of airline and departure airport in price dispersion, considering five different temporal moments. After the analysis of the results were obtained, the estimation of a Gini coefficient was done to measure the degree of inequality in the variation of the prices charged by the airlines over the four weeks prior to the flight.

$$G = 1 - 2\int_0^1 l(z)\,dz \tag{1}$$

where z in the context of price dispersion is the cumulative proportion of price payers (i.e., customers) and l is the corresponding cumulative proportion of prices paid.

The value of this coefficient can vary between zero and one, and the more it deviates from 0, the greater the price variation. Use of the Gini index was to test for the existence of evidence for differences between these coefficients, based on the simultaneous use of other variables investigated.

The preliminary results of the variance analysis did not validate the entire existence of price changes derived from the airline and the airport of departure. This study also sought to determine, through the estimation of the Gini coefficient, the degree of inequality in the variation of the prices charged by the airlines over the four weeks prior to the flight (Figure 1).

The graphs (figure 1) suggest that some companies, such as the Portuguese national carrier TAP, have reduced price dispersion. The higher dispersion observed occurred with the airline Iberica (coef. Gini 0.27). The results of the multifactorial variance analysis, which sought to test the effects of airline and city of departure on the dispersion of rates for the five temporal moments preceding the date of travel (4 weeks; 3 weeks; 2 weeks; 1 week and 2 days prior to travel), suggest that both the company and the airport of departure have ranks where the price variations are clearly different, in terms of their combined effect, which allows us to validate the first hypothesis formulated in this study.

It was possible to verify that both the company and the airport of departure have distinctly different price variations in terms of their combined effect. This verification is consistent with Borenstein and Rose (1994), who documented the existence of significant dispersion in prices charged by each company offering direct air services between higher-density American city-pairs. Other authors cited throughout this work also noted the existence of significant price variations between airlines offering routes between city-pairs.

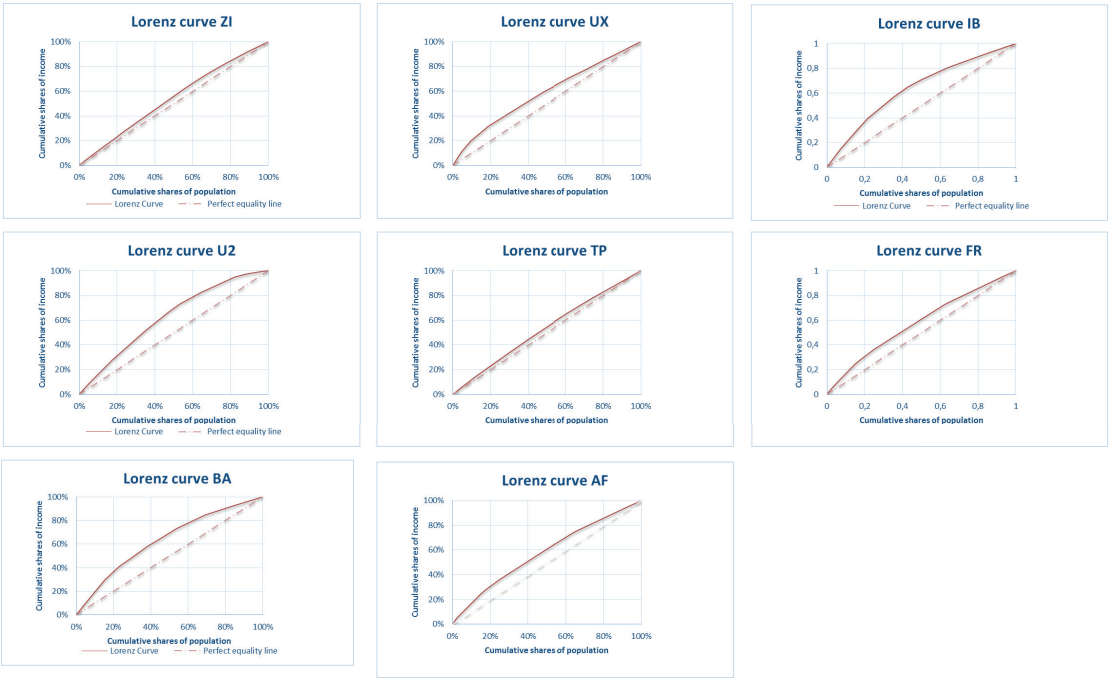

Fig.1 Lorenz curve estimation for each airline

The answer to the second question came through the estimation of the standard deviation (a measure of price dispersion used by Stigler (1961) of the time series of prices provided by each airline in each city. This indicator increases as it approaches the date of travel, particularly in the last week. That allowed us to validate the theory of Varian (1996), which stated that the dispersion of prices will be higher in markets that allow late bookings. The estimation of the Gini coefficient and the coefficient of variation for each airline (used by several authors) confirm the same hypothesis.

With regard to the third and fourth postulates, the Gini coefficient was used as a measure of price dispersion over the four weeks prior to travel and a multifactorial variance analysis was used to see if there were differences in the combined effect of travel reason and travel period with the hub factor itself and the type of company (business model), using each one of the factors of market segmentation (reason and duration of journey). The results failed to reject the null hypothesis. That is, if not obtained empirical evidence of price dispersion between airlines is their ability to discriminate the prices in effect own hub function (an indicator of market power).

Like Hayes and Ross, we are led to believe that as the market power that allowed companies to practice price discrimination is eroded, the low-cost companies can flourish, since the price wars and the financial difficulties weakened the traditional companies. The results do not show empirical evidence that differences in levels of price dispersion is the result of different strategies of market segmentation between LCC and traditional companies (FSC). As with Chellappa et al. (2011), this leads us to conclude that the FSCs tend to imitate the LCCs; they lower the average prices. As the market power of traditional companies diminish, so does the ability to discriminate on the prices.

As with Hayes and Ross, we find significant dispersion in prices charged by the airlines in the next couple of cities analysed, especially in relation to advance purchases (price discrimination on the basis of the largest consumer opportunity cost with respect to time). However, the results do not validate the hypotheses that there

are differences in price dispersion when combining the factors of reason and period of travel (price discrimination factors) with the hub factor itself (power indicator) and with the type of company (i.e., LCC and FSC).

4. Final Considerations

Aviation has changed the way people live and experience the world. Over time, air travel has become so commonplace that it is hard to imagine life without this form of transport. In this scenario, the aviation sector has changed the way people and companies carry out leisure travel or business, shortening travel time and changing the concept of distance. However, the air transport industry presents a set of idiosyncrasies that makes it particularly vulnerable to economic cycles and consumer behaviour. It is sometimes necessary for airlines to adjust suddenly. One of the most visible components of these influences is the dispersion of existing prices. The air transport industry in Europe has undergone profound changes at the beginning of the 21st century, with the expansion of low-cost companies and the EU market enlarged from 15 to 27 countries. Thus, we have been witnessing alliances, mergers, acquisitions, restructurings and bankruptcies. The companies had to follow new models, reviewing their pricing strategies. There is much research that addresses this issue, aiming to assess the impact of consumer price strategies, sales, revenue and profitability of enterprises and industries (Gailey, E. D. 2009). However, most of these works seeks to assess the dispersion of prices outside the European context and from a consumer-centric point of view. This work aimed to contribute to an understanding of this reality through the prism of airlines. It sought to deepen the knowledge of some variables that influence the dispersion of prices. Such variables should be taken into account by the airlines when they develop and evaluate their competitive strategies on pricing.

The current study documented the existence of significant dispersion in prices offered by each airline in the city-pairs observed. This reinforces some of the conclusions of other academic work, as well as increasing the documentation on the European reality. It can also serve as a basis for further research, with the aim of exploring these or other factors that affect the price dispersion in the intra-European air transport market. As a future research track, it would be appropriate to address the effect of code-share agreements and, in a more comprehensive study, strategic alliances on the dispersion of prices. It should be noted that code-sharing and global alliances were strategies adopted by traditional companies in the European network to cope with the expansion of low-cost companies.

Results also show no price dispersion evidences related to typical price discrimination factors or to company hub dominance, which is in accordance to the results of Hayes and Ross. Similar results were found related to the business model type of the airline, which leads us to conclude that full carrier services airlines loss along the way the ability to control price dispersion and tend to imitate the LCCs pricing strategies.

Civil aviation is known for being a marginal and cyclical business. As such, all information that helps promote the operating results is critical. Knowing that the price dispersion has an important influence on revenue and on the profitability of the companies, this work can help marketing managers better understand the reactions of competition vis-à-vis changes in market structure. They can then identify opportunities to adapt their pricing strategies. Information about the effects of competitive factors on the dispersion of prices applies to both managers seeking to enter new markets and those who need to prepare for the entry of rival companies in the markets where they operate. For both, the analysis model provided in this study may help predict how the competition behaves.

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